ULTIMATE KCET

CRASH COURSE 2026

(Zoology) | Lecture - 01

Locomotion and Movement Neural Control and Coordination Chemical Coordination and Integration

By – Raghunath Sir

Recap *of previous lecture*

1. Breathing and Exchange of Gases
2. Body Fluids and Circulation
3. Excretory Products and Their Elimination
4. Most Important MCQs

Topics *to be covered*

1. Locomotion and Movement
2. Neural Control and Coordination
3. Chemical Coordination and Integration
4. Most Important MCQs

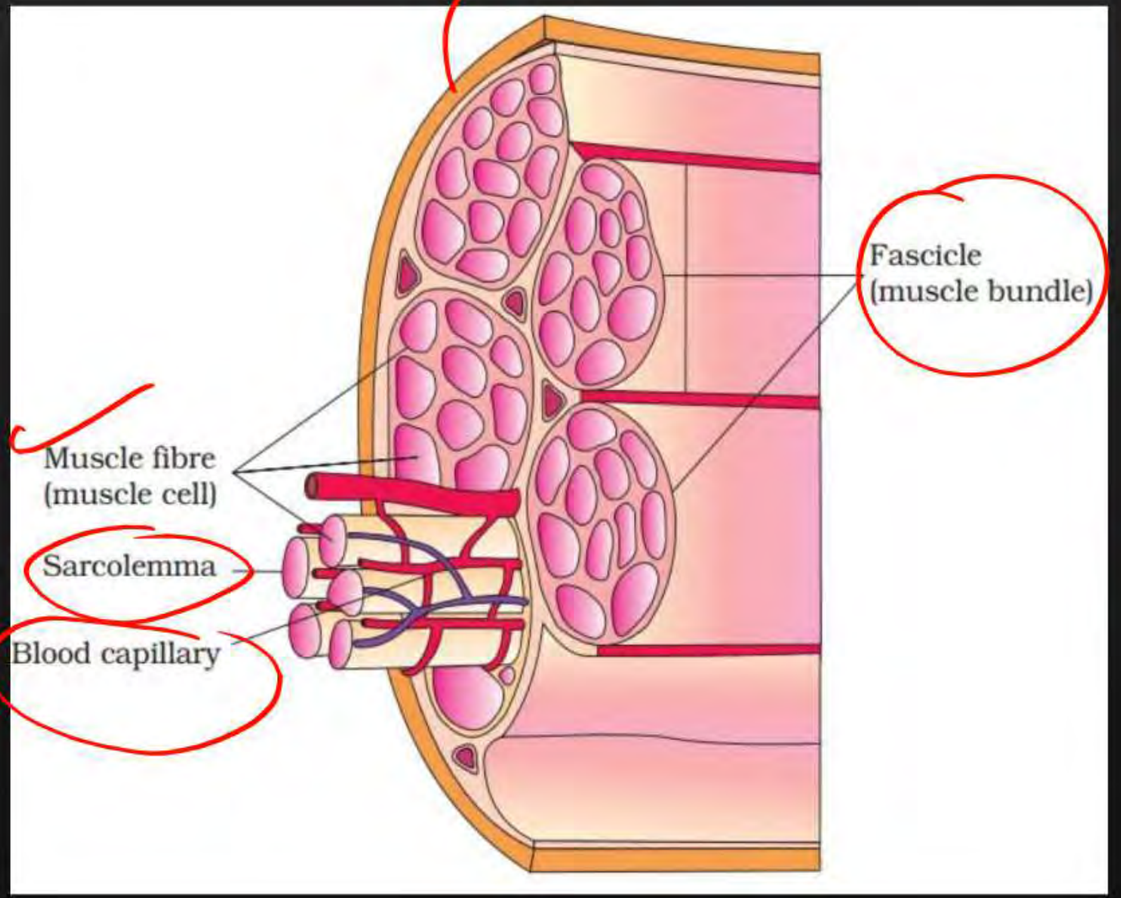
3-4 questions

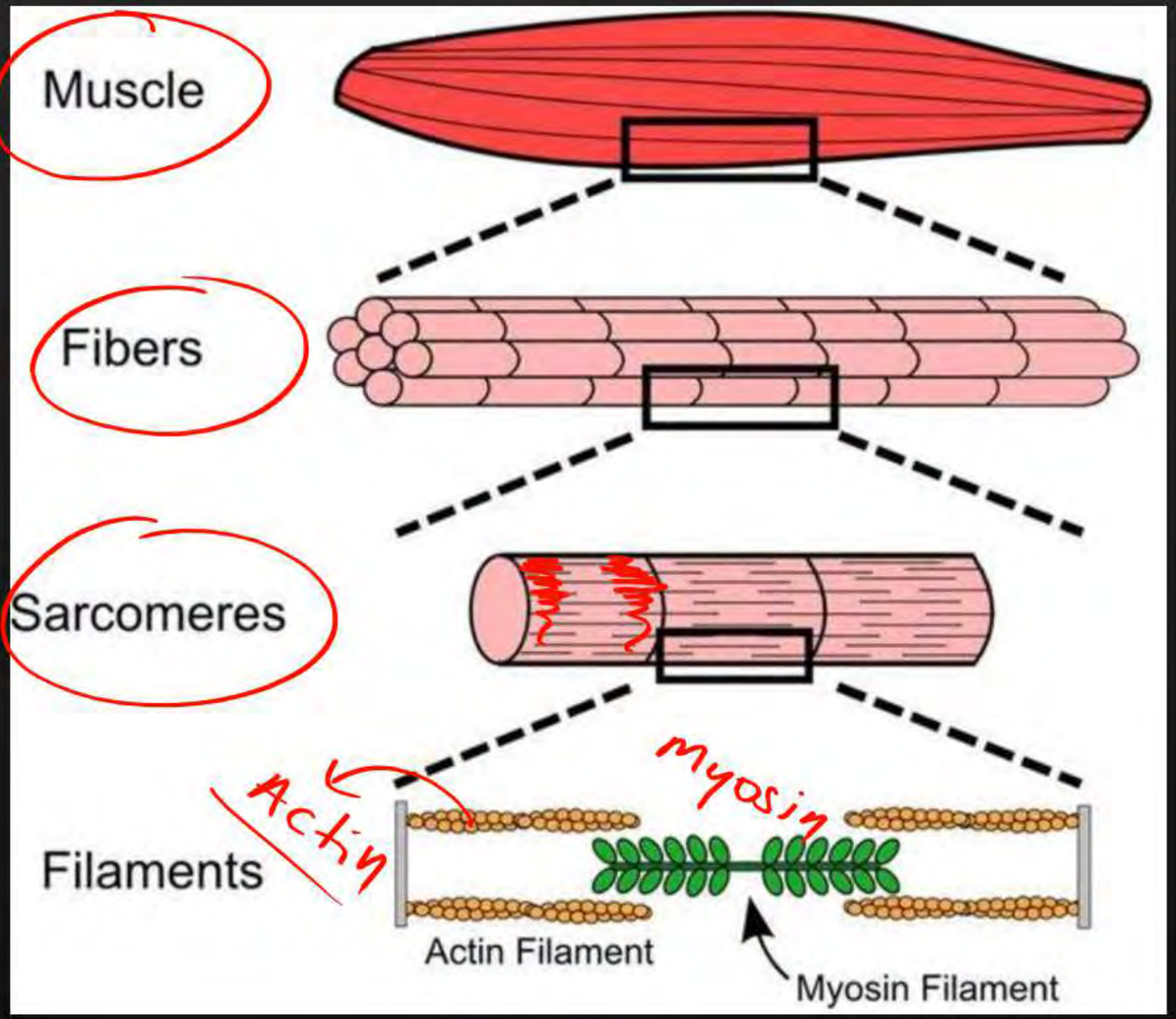
Types of Movements

Types of Movements

- **Amoeboid**
  - Macrophages and leucocytes in blood exhibit amoeboid movements.
- **Ciliary**
  - Coordinated movement of cilia in trachea to remove dusts particles and passage of ova through fallopian tube is example of Ciliary movements.
- **Muscular**
  - Movement of limbs, jaw, tongue, etc. need muscular movement. Contractile property of muscles is used in movement in higher organism including human beings.

Structure of Skeletal Muscle

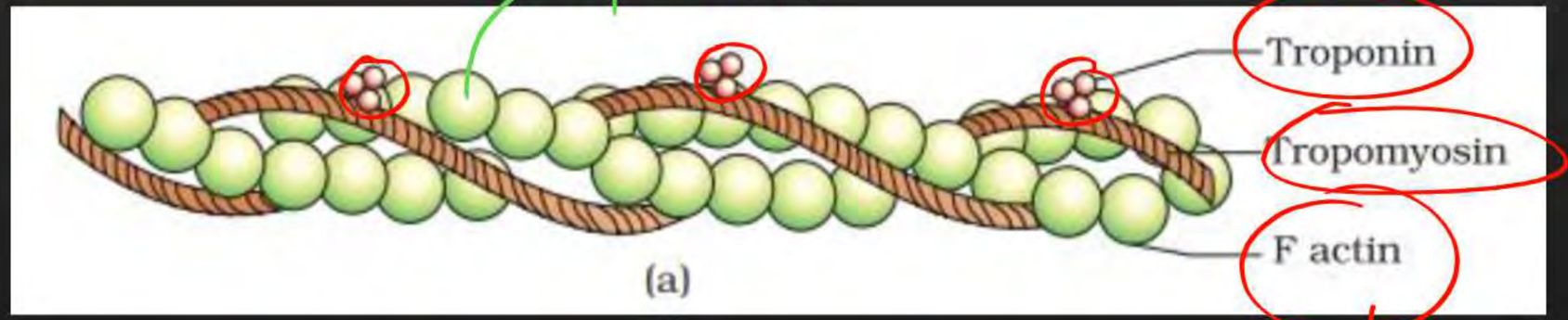




Contractile Proteins

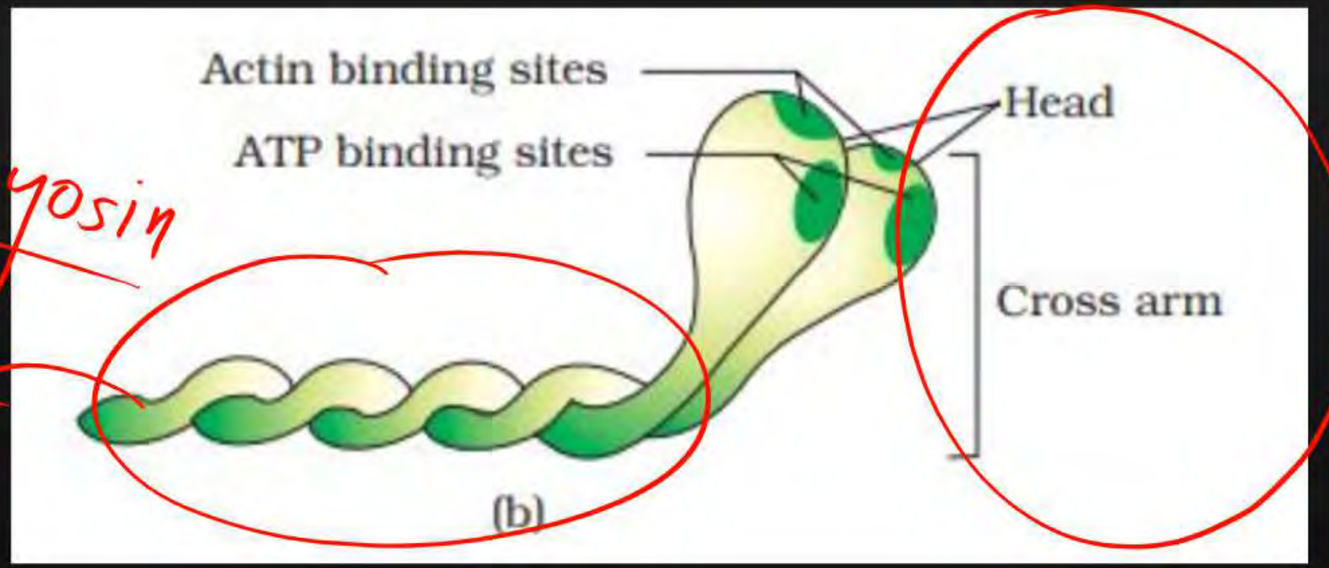
Globular – monomeric

G-actin



→ Polymeric

Myosin



LMM

Heavy Meromyosin
HMM

Skeletal System

Divisions

Axial skeletal system

- Skull – 22 bones
- Hyoid – 1 bone
- Vertebral column – 26 bones
- Sternum – 1 bone
- Ribs – 24 bones

80 Bones

206

Appendicular skeletal system

- Pectoral girdle – 4 bones
- Arms – 60 bones
- Pelvic girdle – 2 bones
- Legs – 60 bones

126 Bones

Pectoral and Pelvic Girdle

Pectoral girdle – 4 bones

Arms – 60 bones

Pelvic girdle – 2 bones

Legs – 60 bones

Upper arms – 1 bone (humerus)

Lower arms – 2 bone (Radius and Ulna)

Wrist – 8 bones (Carpals)

Palm – 5 bones (Metacarpals)

Fingers – 14 bones (Phalanges)

$\times 2 = 60$

Thigh – 1 bone (Femur)

Kneecap – 1 bone (Patella)

Shank – 2 bones (Tibia and Fibula)

Ankle – 7 bones (Tarsals)

Sole – 5 bones (Metatarsals)

Toes – 14 bones (Phalanges)

$\times 2 = 60$

Disorders of Muscular and Skeletal System

NMJ

Myasthenia gravis:

Autoimmune disorder affecting neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscle.

Muscular dystrophy: Progressive degeneration of skeletal muscle mostly due to genetic disorder.

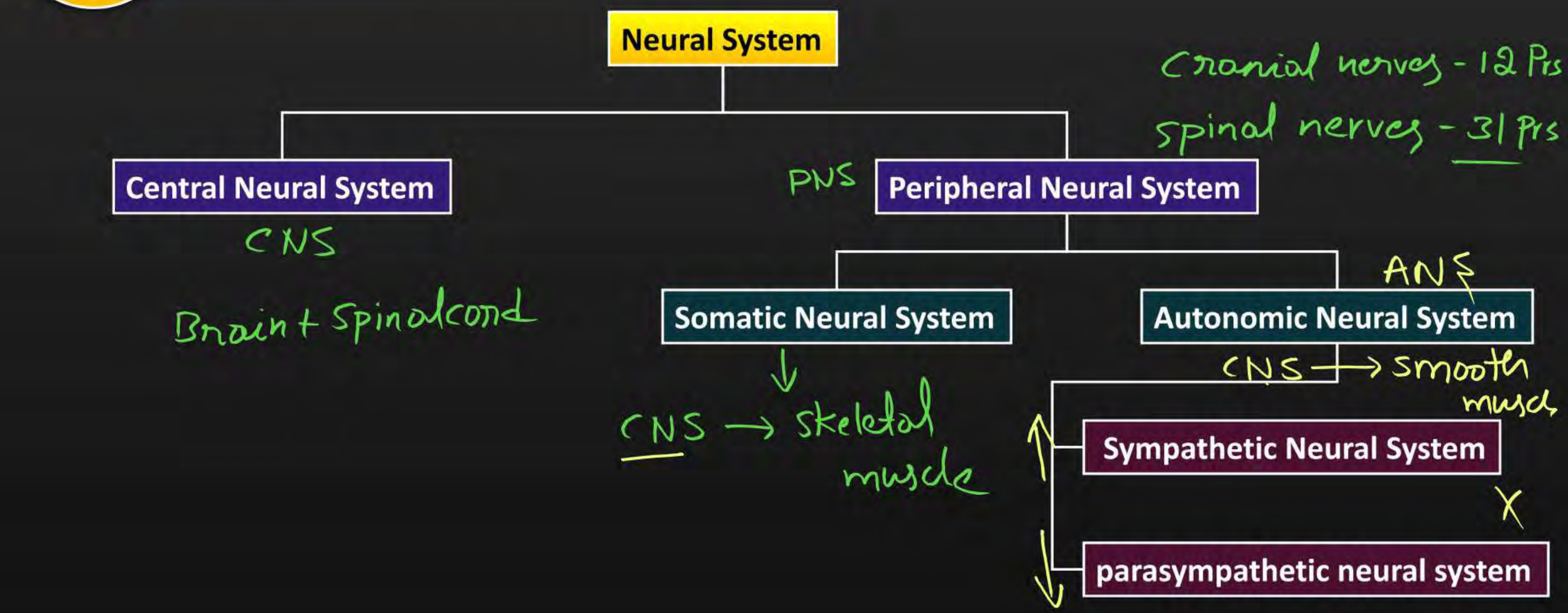
Tetany: Rapid spasms (wild contractions) in muscle due to low Ca^{++} in body fluid.

Arthritis: Inflammation of joints.

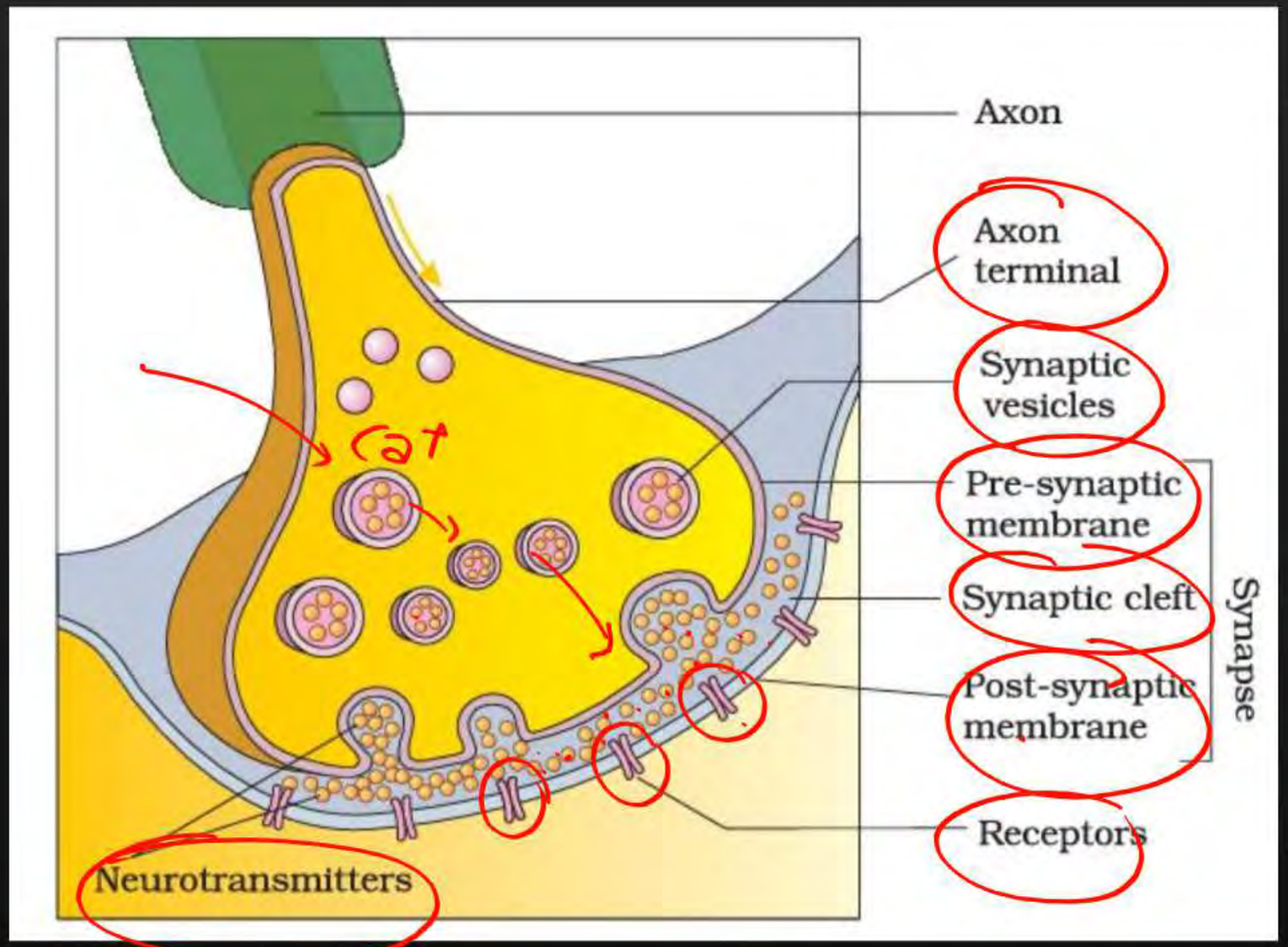
Osteoporosis: Age-related disorder characterised by decreased bone mass and increased chances of fractures. Decreased levels of estrogen is a common cause.

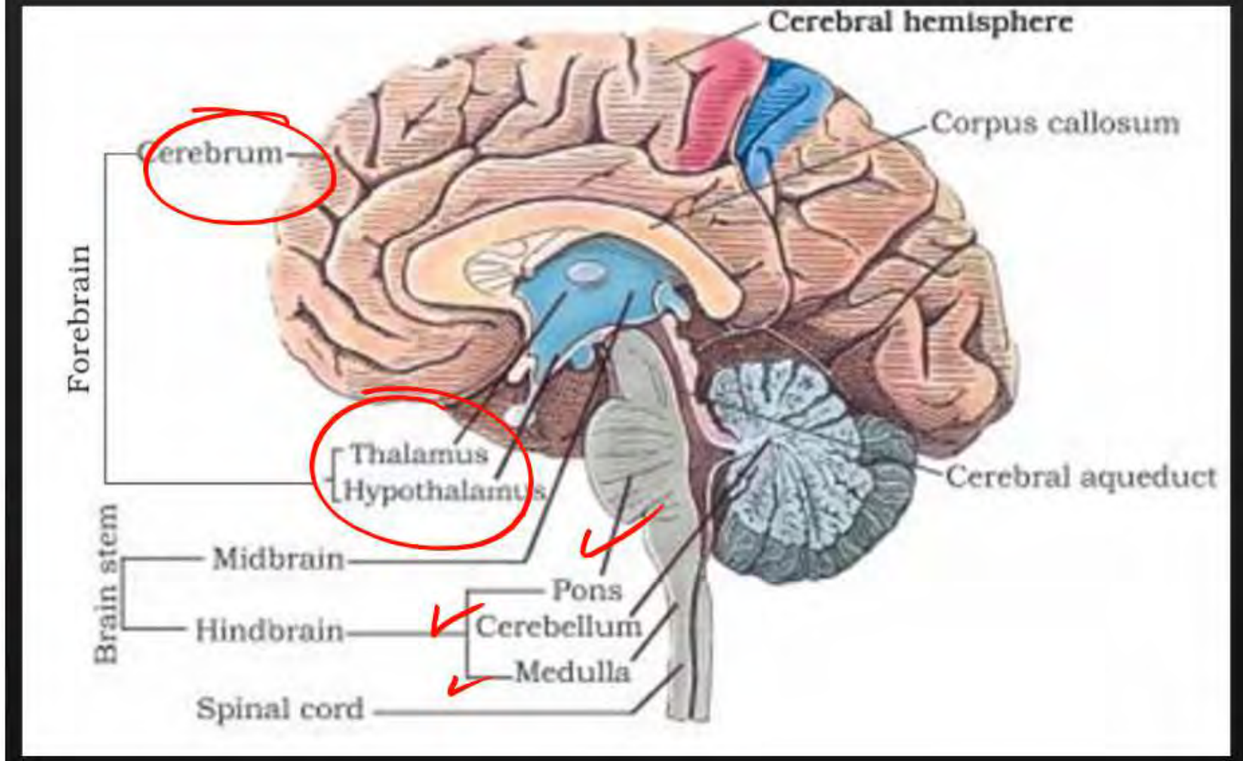
Gout: Inflammation of joints due to accumulation of uric acid crystals.

Neural System



Neuron and Human Brain





Hormones of Heart, Kidney and GIT

Atrial Natriuretic Factor (ANF)	Peptide hormone secreted by the atrial wall of our heart. It decreases blood pressure by causing dilation of the blood vessels.
Juxtaglomerular cells (JG cells)	The juxtaglomerular cells of kidney produce a peptide hormone called erythropoietin which stimulates erythropoiesis (formation of RBC).
Gastrointestinal tract	• **Gastrin** acts on the gastric glands and stimulates the secretion of hydrochloric acid and pepsinogen. • **Secretin** acts on the exocrine pancreas and stimulates secretion of water and bicarbonate ions. • **Cholecystokinin** acts on both pancreas and gallbladder and stimulates the secretion of pancreatic enzymes and bile juice, respectively. • **Gastric inhibitory peptide** inhibits gastric secretion and motility. Several other non-endocrine tissues secrete hormones called growth factors.

Question

Which of the following cellular components play a role in amoeboid movement in cells like macrophages?

A Mitochondria

B Microfilaments

C Ribosomes

D Microvilli

Question

Given below are two statements:

Statement I: Acetylcholine is released at the neuromuscular junction.

Statement II: Each organised skeletal muscle in our body is made of a number of muscle bundles.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Statement I is correct but Statement II is incorrect.

B. Statement I is incorrect but Statement II is correct.

C. Both Statement I and Statement II are correct.

D. Both Statement I and Statement II are incorrect.

Question

Match the following columns and select the correct option.

Column - I		Column - II	
A	Paramoecium (II)	I	Pseudopodia
B	Hydra (III)	II	Cilia
C	Mammals (IV)	III	Tentacles
D	Amoeba (I)	IV	Limbs

A. A-I, B-II, C-III, D-IV

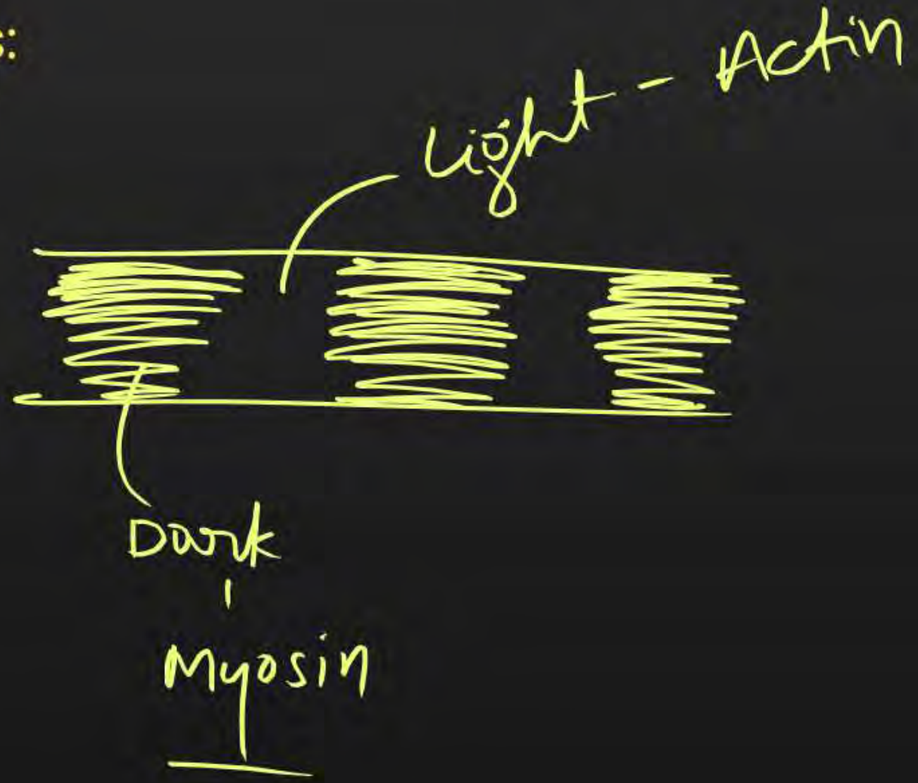
B. A-II, B-III, C-IV, D-I

C. A-II, B-III, C-I, D-IV

D. A-I, B-IV, C-III, D-II

Question

The light bands of skeletal muscles are known as:



A. Isotropic bands.

B. Anisotropic bands.

C. Intercalated disc.

D. Cross bridges.

Question

Select the correct option.

A. Upper arm: Striated and involuntary

B. Fallopian tubes: Non-striated and involuntary

C. Heart: Non-striated and involuntary

D. Alimentary canal - Striated and involuntary

Question

Visceral muscles are:

Smooth muscle
Unstriated muscles

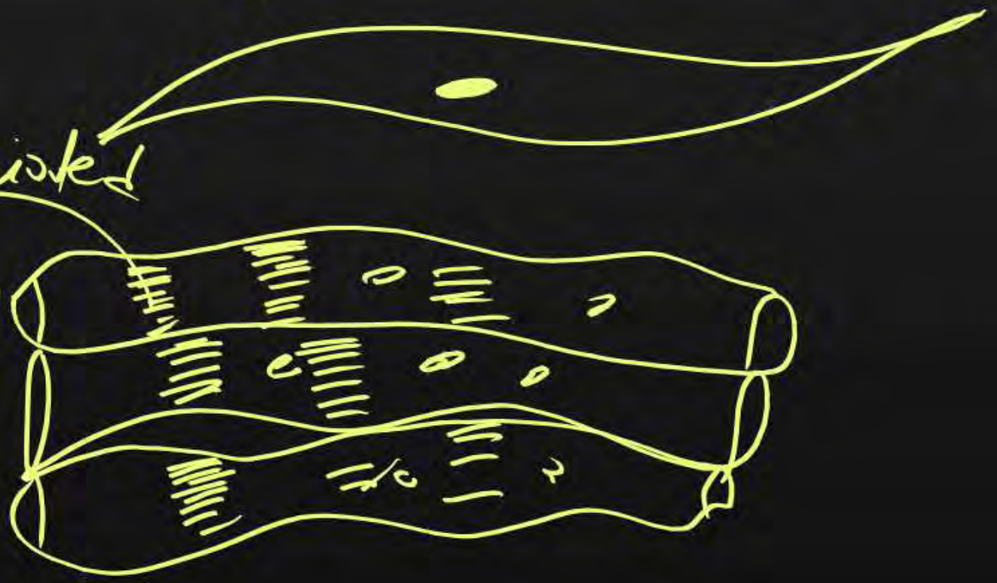
A. Voluntary and striated.

B. Involuntary and striated.

C. Voluntary and non-striated.

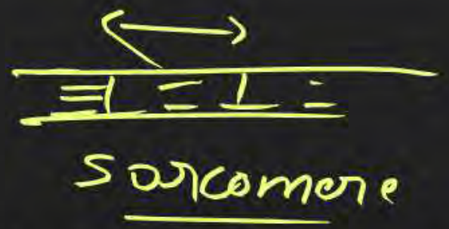
D. Involuntary and non-striated.

Striated
Skeletal



Question

Which of the following structures is correctly organized from large to small?



A Muscle, Muscle cell, Myofibril, Sarcomeres, Filaments.

B Muscle, Muscle fiber, Sarcomere, Filaments, Myofibrils

C Muscle, Sarcolemma, Myofibrils, Actin filaments, Myosin filaments.

D Muscle cells, Myofibrils, Filaments, Sarcoplasm.

Question

Select the correct option.

HMM

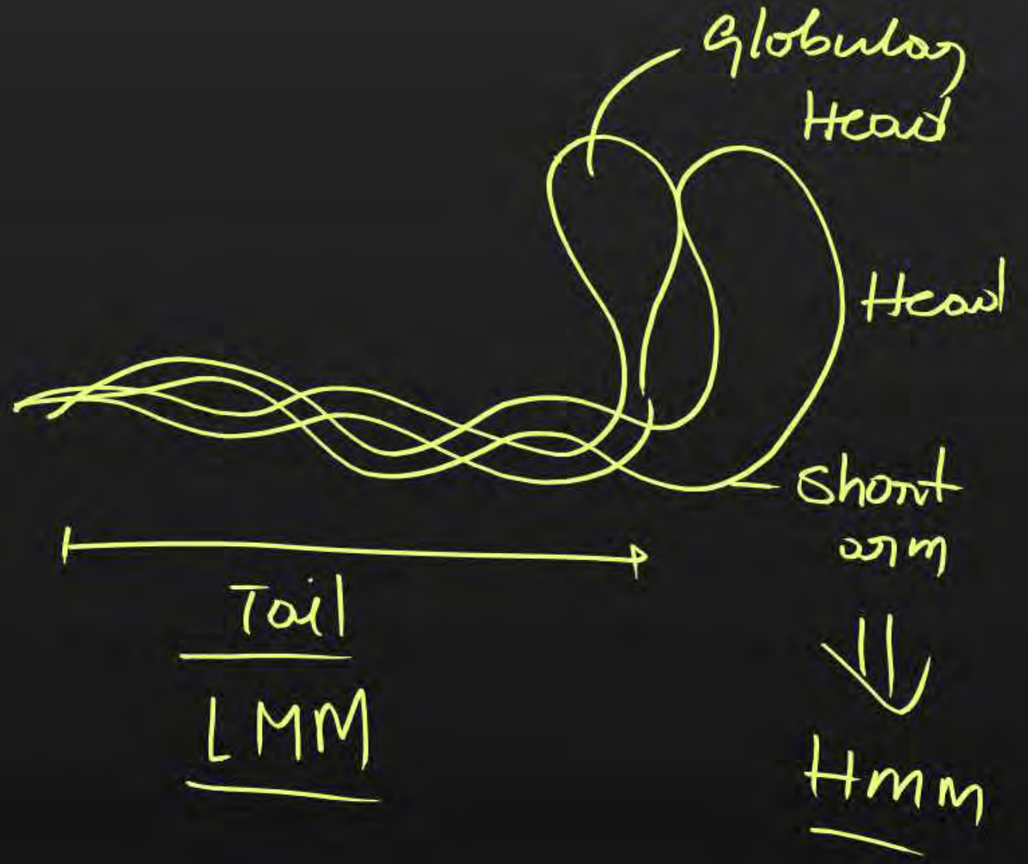
A. Heavy meromyosin = Tail + Short arm ✗

LMM

B. Light meromyosin = Tail + Head ✗

C. Heavy meromyosin = Head + Short arm ✓

D. Light meromyosin = Head + Tail ✗



Question

Read the following statements (A-E).

A. Each myosin filament is a polymerised protein.

B. H-zone is found in the middle of the thick filament.

C. In the centre of each 'I' band is an elastic fibre called 'Z' line which bisects it.

D. The 'A' and 'I' bands are arranged alternately throughout the length of the myofibrils.

E. There are two pairs of floating ribs in the human body.

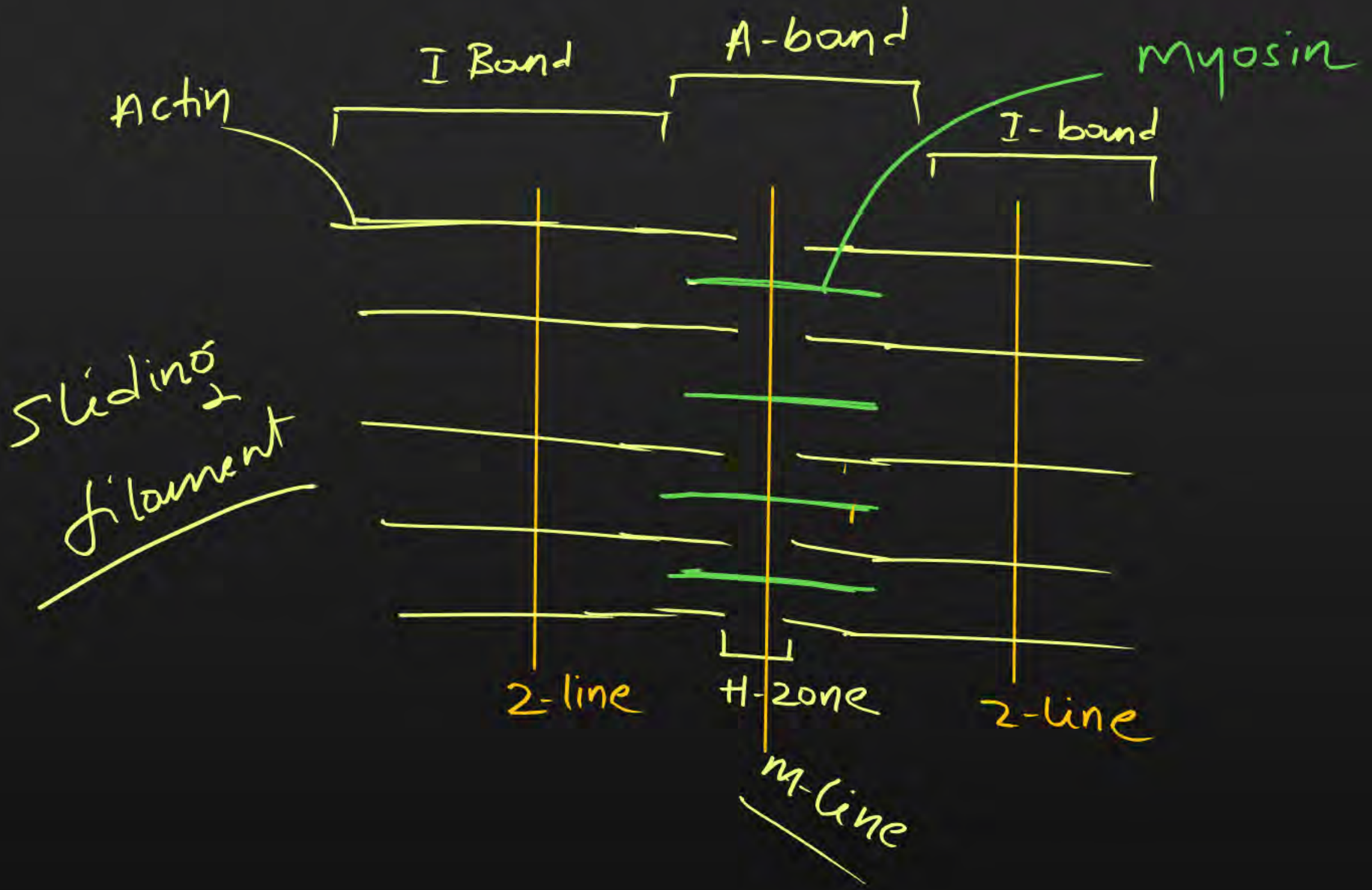
Which of the above statements are correct?

A. A, B and E only

B. A, C and D only

C. A, B, C and D only

D. A, B, C, D and E


I Band
A-band
Actin
Myosin
I-band
Sliding of filament
Z-line
H-zone
Z-line
M-line

Question

Actin protein occurs in which of the following two forms ?

Filamentous

Globular

A. Polymeric F- actin and monomeric G- actin

B. Monomeric F- actin and polymeric G-actin

C. The tail and a head

D. F -actin and G - actin, but both globular.

Question

Calcium ions bind with a subunit of which of the following protein to remove the masking of active sites for myosin?

A Troponin → complex protein

B Tropomyosin

C Myosin ✗

D All of these ✗

Question

Choose the incorrect statement about troponin.

A. At regular intervals of tropomyosin, a complex protein called troponin is present.

B. It masks the active binding sites for myosin on actin filament.

C. It is a complex protein.

D. It has the binding site for magnesium.

Ca^{2+}

Question

Arrange the following events of muscle contraction in the sequence and choose the correct option.

I. Generation of an action potential in the sarcolemma.

II. Formation of a cross bridge.

III. Release of acetylcholine.

IV. Release of calcium ions.

V. Pulling of the attached actin filaments towards the centre of A band.

VI. Remove the masking of active sites for myosin.

A. I → II → III → IV → V → VI

B. III → IV → I → II → VI → V

C. III → I → IV → II → V → VI

D. III → I → IV → VI → II → V

Question

During skeletal muscle contraction, which of the following events occur?

I. H-zone disappears

II. A-band widens – remains constant

III. I-band reduces in length

IV. M-line and Z-line come closer

Choose the correct answer from the options given below:

A. I, III and IV only

B. I, II and IV only

C. II and IV only

D. I, II and III only

Question

Identify the incorrectly matched pair.

A. Sternum and ribs - Axial skeleton

B. Clavicle and glenoid cavity - Pelvic girdle

C. Humerus and ulna - Appendicular skeleton

D. Malleus and stapes - Ear ossicles

Incus

Question

What are the last two pairs of ribs called and why?

12 pairs

1 - 7th → True ribs

8th 9th 10th → False ribs

11th & 12th → Floating

A. True ribs, because they are connected directly to the sternum.

B. Floating ribs, because they do not connect ventrally to the sternum.

C. Vertebrochondral ribs, because they connect indirectly to the sternum.

D. False ribs, because they only connect to the rib above.

Question

Which of the following statements is correct?

A. The humerus joins with the Acetabulum of the Pelvic girdle.

B. The humerus connects to the Glenoid cavity of the Pelvic girdle.

C. The humerus attaches to the Glenoid cavity of the Pectoral girdle.

D. The humerus articulates with the Acetabulum of the Pectoral girdle.

Question

Which of the following pairs is incorrectly matched?

A. Ear ossicles- 6

B. Axial skeleton- 80

C. Facial bones- 14

D. Vertebral column- 24 vertebrae

26

Question

Which of the following pairs is correctly matched?

A. Hinge joint – Between vertebrae

B. Gliding joint – Between carpal and metacarpal of thumb

C. Cartilaginous joint – Between carpals

D. Fibrous joint – Do not allow any movement

Question

Fibrous joints in humans:

→ bones of the skull

A. Allows any movement. ✗

B. Allows little movement. ✗

C. Do not allow any movement. ✓

D. None of these. ✗

Question

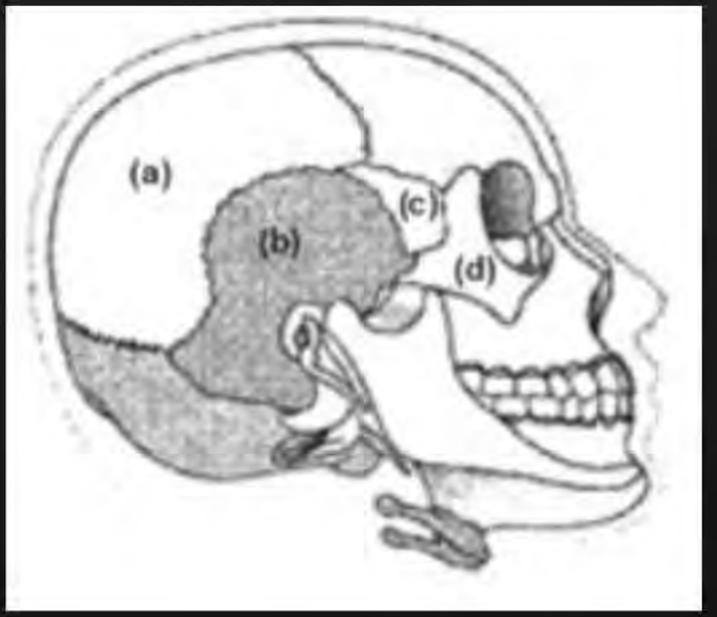
In the given diagram of human skull, Identify (a), (b), (c), and (d).

A Occipital, parietal, temporal, frontal

B Parietal, temporal, sphenoid, zygomatic

C Parietal, temporal, frontal, ethmoid

D Occipital, sphenoid, ethmoid, frontal



Question

Which of the following shows the correct sequential order of vertebrae in the vertebral column of human beings?

A. Cervical → lumbar → thoracic → sacral → coccygeal

B. Cervical → thoracic → sacral → lumbar → coccygeal

C. Cervical → sacral → thoracic → lumbar → coccygeal

D. Cervical → thoracic → lumbar → sacral → coccygeal

Question

Gout is a type of disorder which leads to:

A. Weakening of bones due to low calcium level.

B. Inflammation of joints due to accumulation of uric acid crystals.

C. Weakening of bones due to decreased bone mass.

D. Inflammation of joints due to cartilage degeneration.

Question

Abnormality at neuromuscular junction may lead to

A. Muscular dystrophy

B. Myasthenia gravis

C. Rheumatoid arthritis

D. Osteoporosis

Question

A person is suffering from a disorder X , that cause progressive degeneration of skeletal muscle and it is a genetic disorder. Identify X .

A Osteoporosis

B Tetany

C Myasthenia gravis

D Muscular dystrophy

Question

The junction between the axon of one neuron and the dendrite of the next is called:

A. Nodes of Ranvier.

B. Neurotransmitter.

C. Action potential.

D. Synapse.

Question

Select the correct option from the following.

A. PNS= Brain + Spinal cord = CNS

B. CNS= Afferent + Efferent fibres = PNS

C. ANS= Sympathetic + Parasympathetic ✓

D. CNS= Cranial nerves + Spinal nerves

= PNS

Question

The function of our visceral organs is controlled by

Internal organs

Involuntary

A. Central and somatic nervous system

B. Sympathetic and somatic neural system

C. Sympathetic and parasympathetic neural system

D. None of the above

Question

Somatic neural system carries impulses from:

(SNS)

A. Central nervous system to skeletal muscles ✓ (voluntary)

B. Effectors to cranial nerves

C. Effectors to central nervous system ✗

D. Cranial nerves to effectors ✗

Question

On the basis of the nature of nerve fibres, the nerves are

A. Medullated and non-medullated nerves

B. Myelinated and non-myelinated nerves

C. Sensory, motor and mixed nerves

D. Sensory and motor nerves

Question

All the nerves of the body associated with the CNS (brain and spinal cord) are comprised in:

Cranial + Spinal nerves
12 p 31

A. Peripheral nervous system

B. Somatic nervous system

C. Autonomic nervous system

D. Sympathetic nervous system

Question

Match the following columns and select the correct option.

Column - I		Column - II	
A	Afferent fibres (III)	I	One axon with two or more dendrite
B	Nissl's granules (IV)	II	Transmit impulses from the CNS to smooth muscles
C	Multipolar neurons (I)	III	Transmit impulses from tissue/organ to the CNS
D	Autonomic neural system (II)	IV	Granular bodies

A. A-I, B-II, C-III, D-IV

B. A-III, B-II, C-IV, D-I

C. A-II, B-III, C-I, D-IV

D. A-III, B-IV, C-I, D-II

Question

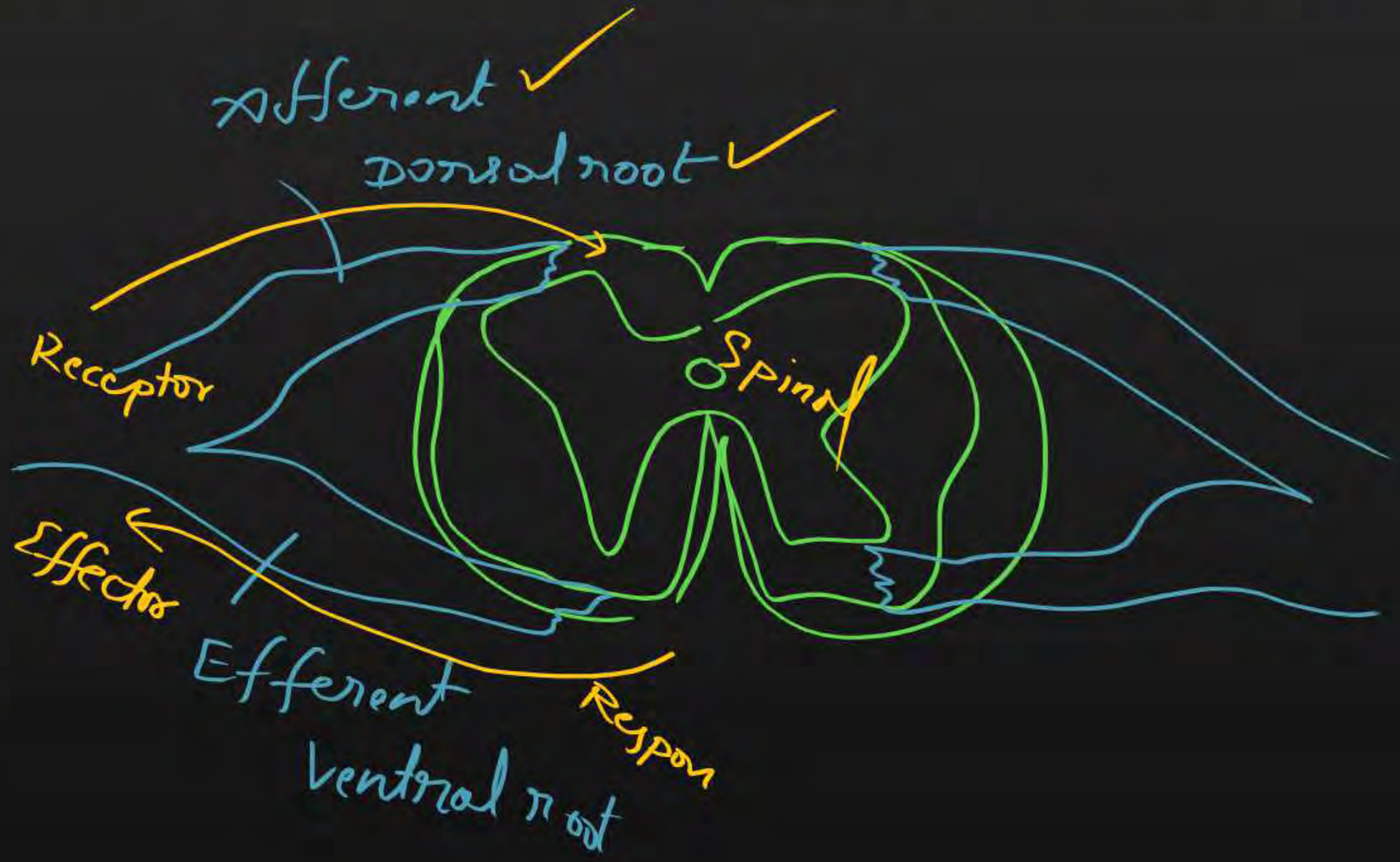
The cell bodies of neurons bringing afferent information into the spinal cord are present in

A. Grey matter of spinal cord

B. White matter of spinal cord

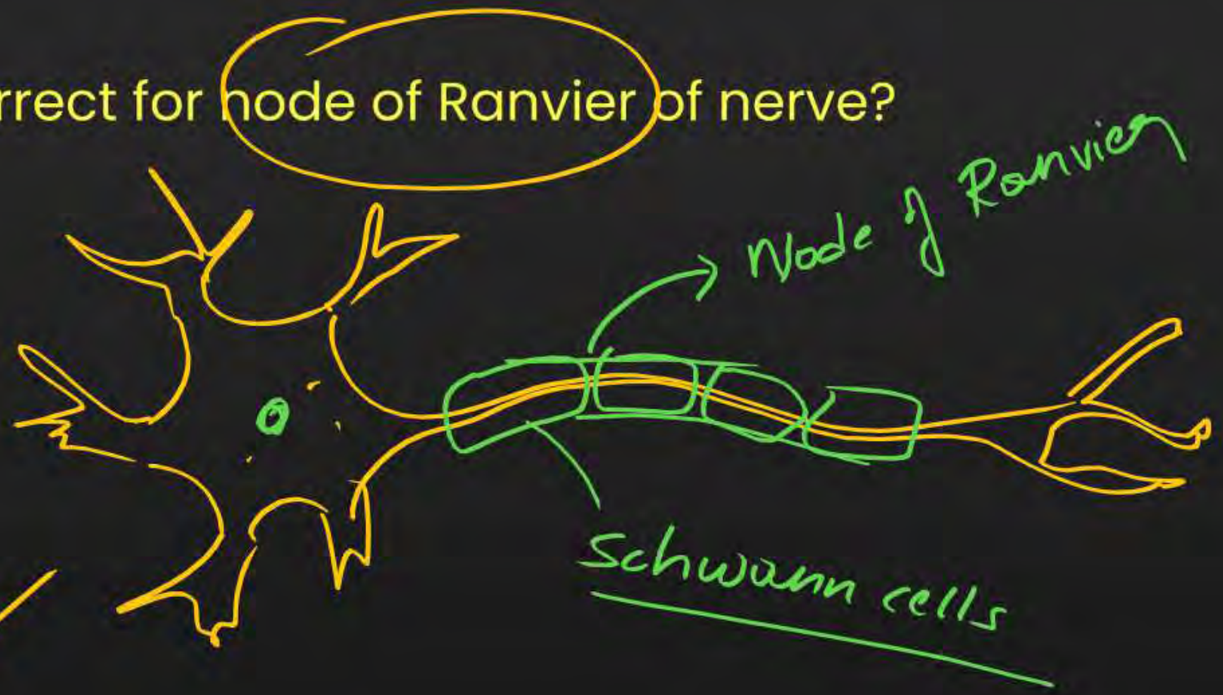
C. Ventral root ganglia

D. Dorsal root ganglia



Question

Which of the following statement is correct for node of Ranvier of nerve?



A. Neurilemma is discontinuous.

B. Myelin sheath is discontinuous.

C. Both neurilemma and myelin sheath are discontinuous.

D. Covered by myelin sheath.

Question

Synaptic knob;

I. Is a terminal bulb-like structure of dendrites and axons.

II. Contains neurotransmitter-filled vesicles.

III. Is a protoplasmic extension of the cell body.

IV. Has long fibres and the distal end is branched.

Which of the following options is most appropriate?

A I and IV are correct

B Only III is correct

C Only II is correct

D I and III are correct

Question

unipolar - Embryonic

bipolar - Retina of the eye

Given below are two statements: one is labelled as

Assertion (A): Multipolar neurons are found in the cerebral cortex.

Reason (R): They consists of one axons and two or more dendrites.

In the light of the above statements, choose the most appropriate answer from the options given below:

A Both (A) & (R) are correct and (R) is not the correct explanation of (A).

B (A) is correct but (R) is not correct.

C (A) is not correct but (R) is correct.

D Both (A) & (R) are correct and (R) is the correct explanation of (A).

Question

Which of these is not characteristic of dendrites?

A. They contain Nissl's granules

B. They branch repeatedly

C. They project out from the axon

D. They transmit impulses

axon / cell body

Question

Which of the following correctly represents the sequence of impulse transmission across a neuron?

A. Dendrite → cell body → axon → axon terminal

B. Cell body → dendrite → axon → axon terminal

C. Axon → cell body → dendrite → axon terminal

D. Dendrite → axon terminal → axon → cell body

Question

With respect to the Na+-K+ pump, for every __A__ ions pumped out, __B__ ions are pumped into the cell.

Choose the correct options to fill the blank.

3Na+

2K+

A: 3 Na+, B: 2K+

B: 2 Na+, B: 3K+

C: 2 Na+, B: 2K+

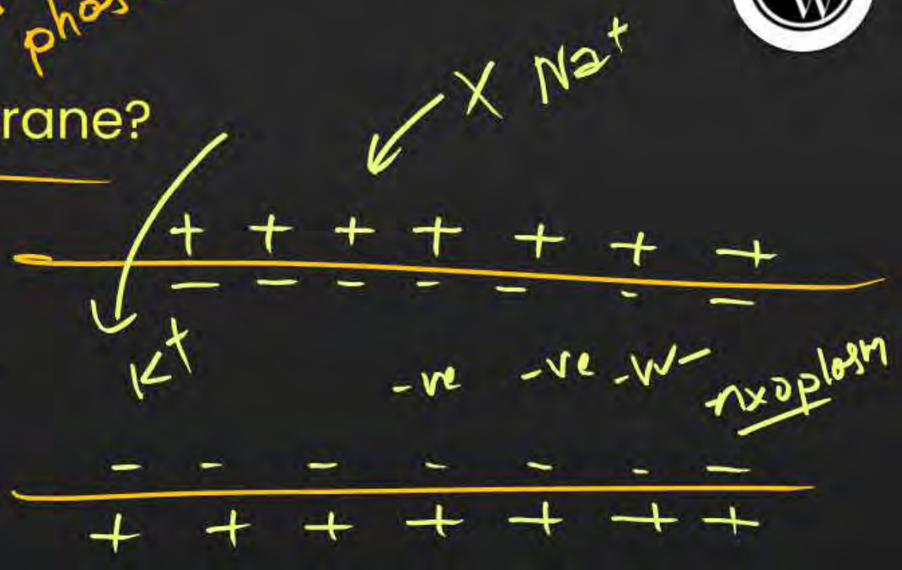
D: 3 Na+, B: 3K+

Question

Which of the following is incorrect for resting axonal membrane?

→ Resting phase

not conducting any impulses



A. Comparatively more permeable to potassium ions (K+).

B. Nearly impermeable to sodium ions (Na+).

C. Comparatively more permeable to sodium ions (Na+).

D. Impermeable to negatively charged proteins present in the axoplasm.

Question

Unidirectional transmission of a nerve impulse through nerve fibre is due to the fact that:

A. Nerve fibre is insulated by a medullary sheath.

B. Sodium pump starts operating only at the cyton and then continues into the nerve fibre.

C. Neurotransmitters are released by dendrites and not by axon endings.

D. Neurotransmitters are released by the axon endings and not by dendrites.

Question

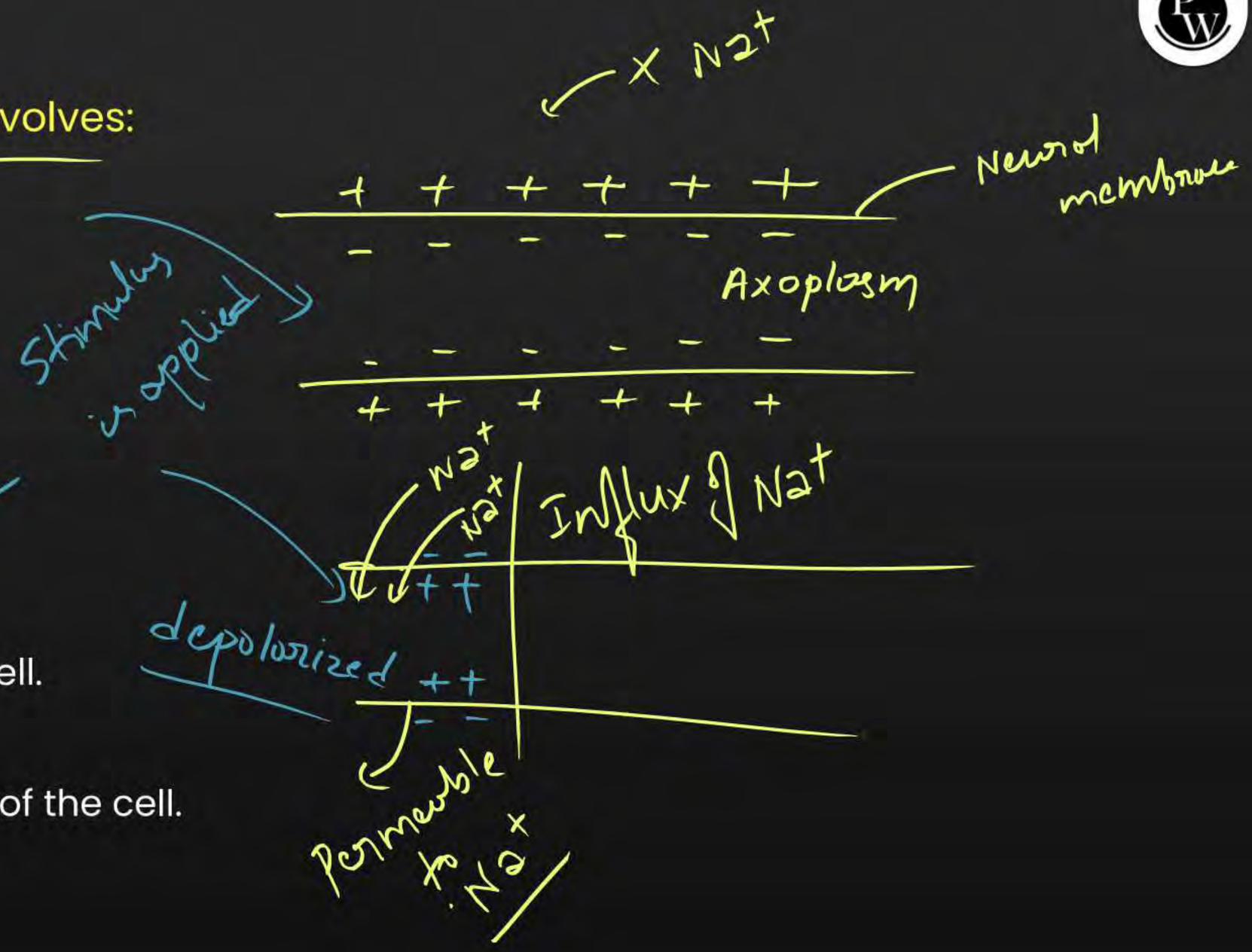
Depolarisation of nerve cell involves:

A. Influx of K+ in cell.

B. Influx of Na+ in cell.

C. Influx of Ca2+ and Cl– in cell.

D. Efflux of Ca2+ and Cl– out of the cell.



Question

Identify the proper sequence and mark the correct option.

I. Opening of ion channels.

II. Release of neurotransmitters.

III. Fusion of synaptic vesicles with membrane.

IV. Action potential arrives at axon terminals.

V. Action potential stimulates movement of synaptic vesicles towards the membrane.

VI. Binding with receptors, present on postsynaptic membrane.

VII. New action potential generated.

IV → V → III → II → VI →

A I → II → III → IV → V → VI → VII

B VII → VI → V → IV → III → II → I

C IV → V → III → II → VI → I → VII

D III → I → IV → V → II → VI → VII

Question

Name the chemicals which are involved in the transmission of impulses at the synapses.

A. Hormones

B. Enzymes

C. Neurotransmitters

D. None of these

Question

Match the following columns and select the correct option.

Column - I		Column - II	
A	Cerebrum	I	Controls the pituitary.
B	Cerebellum	II	Memory and communication.
C	Hypothalamus	III	Controls the rate of heart beat.
D	Medulla oblongata	IV	Provides additional space for more neurons.

(A) A-IV, B-I, C-II, D-III

(B) A-III, B-IV, C-II, D-I

(C) A-IV, B-III, C-I, D-II

(D) A-II, B-IV, C-I, D-III

Question

Which of the following statement is incorrect?

A. Forebrain consists of cerebrum only.

B. Cerebrum forms the major part of the human brain.

C. The cerebral hemispheres are connected by a tract of nerve fibres called corpus callosum.

D. The gaps between two adjacent myelin sheath is called node of Ranvier.

Question

Given below are two statements.

Statement I: Limbic system is concerned with olfaction and autonomic responses.

Statement II: Electrical synapses are rare in our system.

In the light of the above statement, choose the correct answer from the options given below:

A. Statement I is correct, but statement II is incorrect.

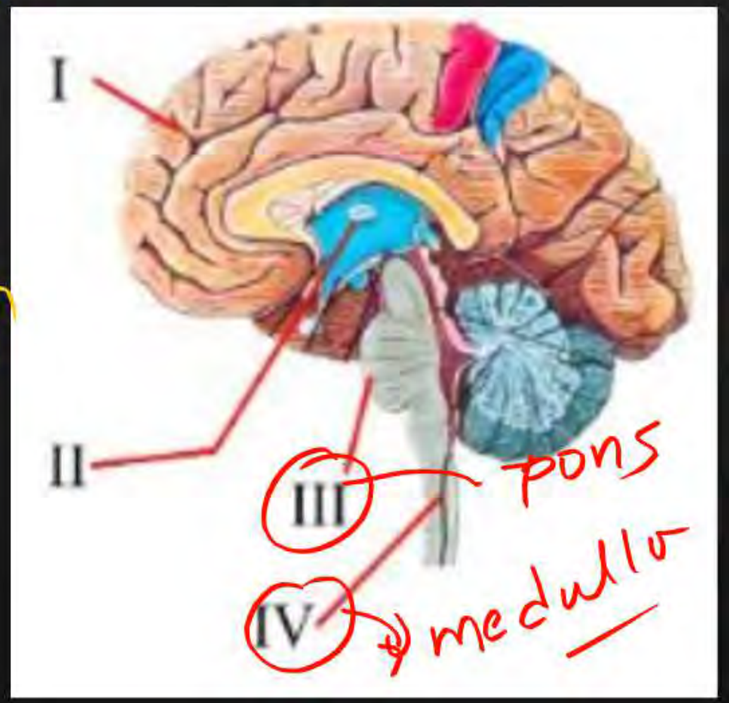
B. Statement I is incorrect, but statement Ii is correct.

C. Both statement I and statement II are correct.

D. Both statement I and statement II are incorrect.

Question

A sagittal section of the human brain is shown here. Identify at least two labels from I-IV:



A. III-Mid brain IV-Cerebellum

B. I-Cerebrum III-Pons

C. II-Corpus callosum IV-Medulla

D. I-Cerebral hemispheres II-Cerebellum

Question

Select the incorrect statement.

Melatonin

Pineal gland

A. Sleep-wake cycle and pigmentation are regulated by hypothalamus

B. Insulin plays a major role in glucose homeostasis

C. There are about 1-2 million islets of Langerhans in a normal human pancreas

D. Adrenaline increases alertness and pupillary dilation

Question

Which of the following statement is incorrect?

A. Pituitary gland is under the control of hypothalamus.

B. All glands in the human body are heterocrine glands.

C. Testes and ovaries are endocrine glands.

D. Pancreas gland performs dual functions.

→ Exocrine → Enzyme
Endocrine → Hormone

→ Dual functioning

Question

Read the following statements (I-IV) w.r.t hormones.

(I) Hormones are non-nutrient chemicals.

(II) They act as intercellular messengers.

(III) Hormones are produced in large amounts.

(IV) Hormones are secreted from exocrine glands.

How many of the above given statements is/are correct?

A One

B Two

C Three

D Four

Question

Which of the following statement is incorrect?

A. Pituitary gland is under the control of hypothalamus.

B. All glands in the human body are heterocrine glands.

C. Testes and ovaries are endocrine glands.

D. Pancreas gland performs dual functions.

Question

Match the following columns and select the correct option.

Column - I		Column - II	
A	Pineal (II)	I	Epinephrine
B	Thyroid (IV)	II	Melatonin
C	Ovary (III)	III	Estrogen
D	Adrenal medulla (I)	IV	Tetraiodothyronine - T4 - Thyroxy

A. A-IV, B-II, C-III, D-I

B. A-II, B-IV, C-I, D-III

C. A-IV, B-II, C-I, D-III

D. A-II, B-IV, C-III, D-I

Question

Ovulation in human females is controlled by:

Release of secondary oocyte

14th day

LH surge

A. Prolactin.

B. Growth hormone.

C. Luteinising hormone.

D. Adrenocorticotropic hormone.

Question

Given below are two statements:

Statement I: Low secretion of GH results in stunted growth resulting in pituitary dwarfism.

Statement II: LH and FSH stimulate gonadal activity and hence are called gonadotrophins.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Statement I is correct but Statement II is incorrect.

B. Statement I is incorrect but Statement II is correct.

C. Both Statement I and Statement II are correct.

D. Both Statement I and Statement II are incorrect.

Thank You